made by the insect herself for the purpose. I have found no reference to the oviposition of the species of *Elaphidion*, our common allies of *Tragidion*.

The beetle in question is attracted to some coarse flowers, as the *Silphium perfoliatum*, or is destructive to ripe fruit, as peaches, by gouging into the tender fruit, the juices of which are a favorite food. I have also observed them eating the flesh of a ripe watermelon in company with other fruit-boring insects, the cetonians, wasps, and flies.

A STUDY OF THE ALBUMINOIDS.

BY PROF. L. E. SAYRE, STATE UNIVERSITY.

[*Abstract.*]

For several years past various attempts have been made to concentrate and bring to a convenient form for administration as remedial agents the digestive principles contained in the gastric juice and pancreatic fluid. While the efforts in this direction have thrown much light upon the nature of these principles, their exact constitution has not been studied, for the reason that no one seems to have as yet accomplished the difficult task of isolating them.

The two processes adopted by pharmacists at the present time for the purpose of making medicinal pepsin are about as follows: One is known as Scheffer's process, by which the pepsin is dissolved out of the mucous lining, along with other albuminous substances by means of slightly acidulated water. The resulting liquid is treated with chloride of sodium, which causes a light, flocculent precipitation of these substances. The precipitate, collected, washed, and dried, constitutes this form of pepsin, which appears in the market in the form of a light-brown powder. More usually it comes as saccharated pepsin; this is a white powder composed of the above so-called pure pepsin and a liberal quantity of sugar of milk. It is slightly soluble in water. The kind of pepsin known as crystal, flake or scale pepsin is quite a different article in appearance and composition. It is composed largely of peptone holding in its substance a good deal of peptic power. In preparing it advantage is taken of the peculiar influence which heat exercises, in the presence of acidulated water, over the mucous lining of the stomach. The finely-chopped mucous membrane is digested in a very mildly-acidulated aqueous solution at a temperature of 38° C. until the whole is obtained in a viscid solution. This is filtered, neutralized, and evaporated at a temperature not over 40° C., until a thin, transparent scale is formed. This product comes in market in yellowish, transparent laminæ, very soluble in water. It also appears in the form of a white powder in the saccharated form.

The process of manufacture of pancreatin upon a large scale for the market has been kept pretty closely as a trade secret. It appears in the market in the form of a yellowish-brown powder, almost entirely soluble in water, and of a disagreeable odor. It has the special property of digesting albuminous substances in an alkaline solution. Pepsin will accomplish this only in acid solutions. Its application as a medicinal agent is especially valuable in certain forms of infantile digestion and certain depressed conditions of the digestive functions in adults, where a milk diet is indicated. Pancreatin is used in these cases to dissolve (digest) the caseine of the milk. The predigested milk becomes a very nutritious substance, and is easily assimilated by a very feeble stomach.

The method I have used for the purpose of preparing pancreatin is in substance as follows: The finely-chopped pancreas is macerated for twenty-four hours in a mixture of equal parts of glycerine and water, using one fluid ounce of the mixture

to each ounce of the gland. The liquid is pressed through a cloth strainer, and a precipitate obtained by the use of strong alcohol. This yields a light-yellow product with an unctuous feel, not very freely soluble in water. My own experiments for the past year have been directed principally in the direction of a study of these two so-called principles — pepsin and pancreatin. I have attempted, in the case of pepsin, to obtain a highly-concentrated preparation by the elimination of foreign albumens, and in the case of pancreatin have tried to verify or disprove, to my own satisfaction at least, some of the statements of writers regarding its properties. These properties are about as follows:

1. Property of converting albumen into peptone.
2. Converting starch into sugar.
3. Converting fats and oils into emulsions.
4. The digesting of the caseine of milk.

It is beyond the scope of this paper to give in detail the numerous experiments, and therefore I shall confine myself to a brief summary of results.

Before giving this summary, it may be well to state that it is a very difficult matter to obtain a pepsin which will remain permanent — a grain of which will digest 1,200 to 1,500 grains of coagulated albumen. To obtain such an one, very careful manipulation is required, and the result is more readily accomplished by following the Sheffer process.

I have found that if the acidulated solution of the mucous lining be treated with from 2 per cent. to 3 per cent. of choloride of sodium and allowed to stand, there appears to be a precipitation of a substance which has a viscid, mucous-like character, and is odorous. While it has weak peptic power, the latter seems to be merely an admixture. I could not say at present that it has other properties than that ascribed to pepsin, but it appears different. The principal point I wish to call attention to is that there is left in solution a product which seems to have greater power than if it were precipitated along with the substance above mentioned. The solution remaining after the removal of the first precipitate was saturated with common salt, and the precipitate (second precipitate) has, when washed and dried, a digestive power in excess of what is usually known as pure pepsin. It is less viscid, being much more granular, lighter in color, and almost free from odor. At this time I am not prepared to say what importance may be attached to these results, but to me it indicates that this treatment has yielded a more concentrated pepsin by the removal, or partial removal, of an albuminous substance foreign to pepsin.

I have endeavored in another line of experiments to ascertain which part of the mucous lining of the stomach secretes the most pepsin. For this purpose I have taken and separated the lining into three parts:

1. The loose viscid magma.
2. The thin cuticular layer.
3. The sub-cuticular layer which joins the muscular coat of the stomach.

These were all placed in macerating vessels and treated in the same manner, using substantially the Sheffer process. To my surprise I found that the macerate of the first mentioned produced a product of very weak peptic power, the thin cuticular layer produced a product of extraordinary strength, the third one of intermediate power. These experiments have been repeated a number of times with the same results. I propose to repeat these experiments and endeavor to arrive at some positive conclusion concerning them. As a summary of my work in pancreatin, in which I was aided by Mr. F. L. Abbey, in the pharmaceutical laboratory, I would state the following as my conclusions:

1. One grain of pancreatin digests eighty grains of coagulated egg albumen.

—2

2. Pancreatin acts most readily upon albumen in a slightly alkaline medium, is less active in a neutral solution, and is slowly rendered inert in an acidulated medium.

3. Pancreatin is inferior to pepsin in its action upon coagulated egg albumen.

4. One grain of pancreatin in a neutral medium dissolves 64 grains of lean meat, and in alkaline solutions 140 grains are dissolved. Alkalinity favors meat digestion. Pancreatin is equal to pepsin in its action upon meat.

5. One grain of pancreatin will curdle and convert into peptone the casein in 900 to 1,000 grains of milk.

6. Pancreatin is peculiarly active in the digestion of milk.

7. One grain of pancreatin converts 100 grains of starch in one to two hours, but requires from four to six hours to convert it into sugar. Its diastatic power is increased by alkalinity.

8. One grain of pancreatin will emulsify 50 grains of cod liver oil, and, more completely, an equal quantity of lard. Alkalinity is almost essential to complete emulsification of fats.

9. Pancreatin is slowly and incompletely soluble in water.

10. While pepsin is more powerful in its specific action than pancreatin, the latter has such a variety of functions that it cannot be regarded as inferior to pepsin.

A NEW FRAME FOR THE POCKET MICROSCOPE.

BY PROF. L. E. SAYRE, STATE UNIVERSITY.

A simple microscope — a "pocket lens" as it often and preferably is called — is indispensable to every one who has a taste for "nature studies;" not only because of its special quality of magnification as compared with the compound microscope, but because it is always ready for the examination of anything picked up along the roadside, in the fields or woods. It is small, and easily carried in the pocket. It has always seemed to me, however, that this little instrument, useful as it is, does not entirely fill the requirements of the botanist in his out-door and field work; because it is not mounted in the most suitable frame for the purpose of examining the small flowers and parts of the flower. This is especially perceptible when one endeavors to hold in one hand this pocket lens and the object for examination, and with the other endeavors, with more or less deft fingers, to dissect the object — the smaller the object the more difficult it becomes. The position of the operator, to say the least, is very awkward when he attempts an analysis with the ordinary pocket lens. This I have endeavored to overcome in the device I herewith present.* It consists of a long handle, at one end of which is hinged a stem, which can move freely from the socket above as a knife-blade does in its handle. At the extremity of this stem there is inserted a ball and socket joint which is surmounted by a second smaller stem, and this is surmounted by the microscope.

It will be perceived that from this construction the magnifying lenses will have full play, and can be placed in any position while it is being held firmly by the hand. Furthermore, while it is thus being held in any position desired, the thumb and index finger of the same hand are left almost perfectly free to hold any object however minute. At the same time the other hand is left entirely free to operate with dissecting needles or any dissecting botanical instruments necessary for the purpose.

---

* Prof. Sayre here exhibited his new microscope frame and microscope attached, and illustrated its merits.